Introduction
This module provides an introduction to the Connexions Deomonstration and Tutorial Workshop. Learners are provided with a list of additional resources, including email addresses and supporting websites, that they may find useful after completing the workshop.

What is Connexions?

Connexions is a place to view and share educational material made of small knowledge chunks called modules that can be organized as courses, books, reports, *etc*. Anyone may view or contribute:

- **authors** create and collaborate
- **instructors** rapidly build and share custom collections
- **learners** find and explore content

System Requirements

Connexions currently supports the Firefox (version 3.0 and later) and Internet Explorer (version 6.0 and later) web browsers. Additional third-party plug-ins are required for viewing some content, including MathML. For additional information about supported web browsers, please see http://cnx.org/help/browser-support.

Contacting Connexions

There are several ways to get answers about Connexions:

- To ask a question or get more information about the Connexions project, please contact cnx@cnx.org.
- To report a problem with the site, please visit http://cnx.org/bug_submit_form or send an e-mail to techsupport@cnx.org
- To request technical assistance with the site or with authoring in CNXML, please contact techsupport@cnx.org.

- To report a bug or other problem with the site, please visit http://cnx.org/bug_submit_form.

Joining the Connexions Community

We invite you to participate in the Connexions Community by subscribing to one of the following services:

- To view our blog, please visit http://blog.cnx.org. RSS feeds for blog posts are also available from this site.
- To follow us on Twitter, please visit http://twitter.com/cnxorg.
- To become a fan of Connexions on Facebook, please visit http://www.facebook.com/cnx.org.

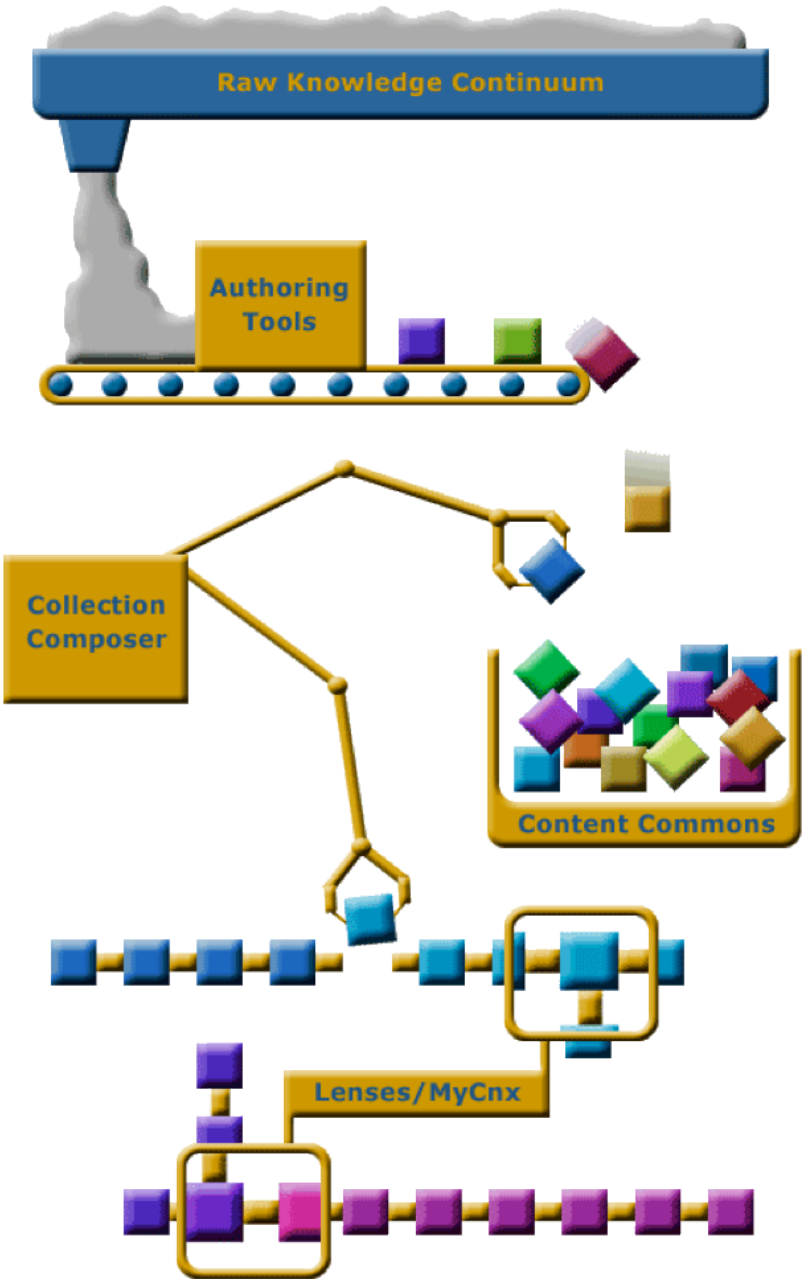
Connexions Philosophy

This module provides a CNXML-based version of the Connexions Philosophy page (http://cnx.org/aboutus/). It describes our motivation for doing what we do the way we do it.

Connexions is an environment for collaboratively developing, freely sharing, and rapidly publishing scholarly content on the Web. Our Content Commons contains educational materials for everyone - from children to college students to professionals - organized in small modules that are easily connected into larger collections or courses. All content is free to use and reuse under the Creative Commons "attribution" license.

Content should be modular and non-linear

Most textbooks are a mass of information in linear format: one topic follows after another. However, our brains are not linear - we learn by making connections between new concepts and things we already know. Connexions mimics this by breaking down content into smaller chunks, called modules, that can be linked together and arranged in different ways. This lets students see the relationships both within and between topics and helps demonstrate that knowledge is naturally interconnected, not isolated into separate classes or books.



Sharing is good

Why re-invent the wheel? When people share their knowledge, they can select from the best ideas to create the most effective learning materials. The knowledge in Connexions can be shared and built upon by all because it is reusable:

- **Technologically**We store content in XML, which ensures that it works on multiple computer platforms now and in the future.

- **Legally**The Creative Commons open-content licenses make it easy for authors to share their work - allowing others to use and reuse it legally - while still getting recognition and attribution for their efforts.
- **Educationally**We encourage authors to write each module to stand on its own so that others can easily use it in different courses and contexts. Connexions also allows instructors to **customize** content by overlaying their own set of links and annotations. Please take the Connexions Tour and see the many features in Connexions.

Collaboration is encouraged
Just as knowledge is interconnected, people don't live in a vacuum. Connexions promotes communication between content creators and provides various means of collaboration. Collaboration helps knowledge grow more quickly, advancing the possibilities for new ideas from which we all benefit.

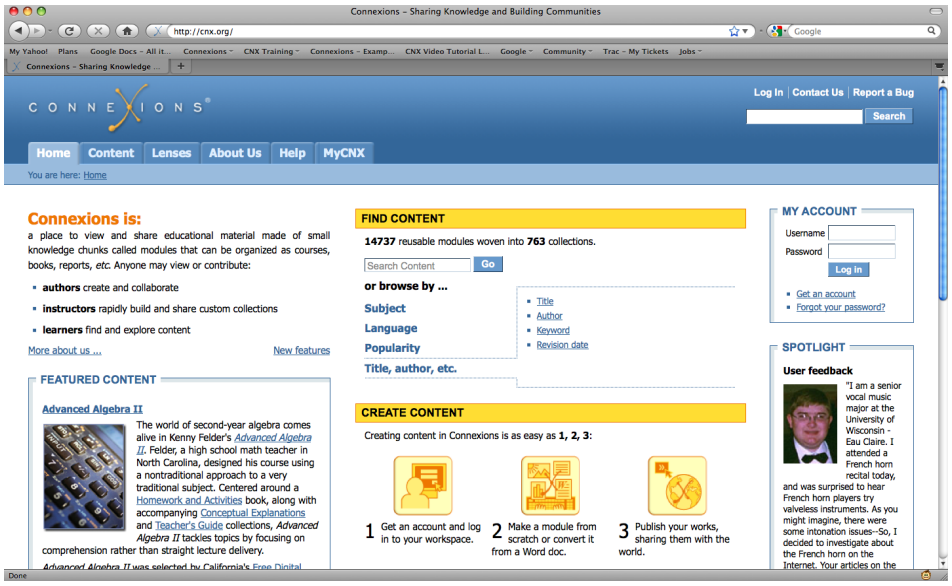
Site Orientation
This module provides a basic overview of the Connexions website in order to familiarize learners with the major site features and navigation system.

Note: See Also: Introduction to Connexions (http://cnx.org/content/m10884/latest/)

No Login Required

You do not need to be logged in to access any of the published content on the site. You can download, view, print, share, or repurpose any content in Connexions for free, without even providing an email address. In fact, the only thing you **HAVE** to have an account for is to **CREATE** content, so we can keep track of whose is whose and make sure to give you credit for your work.

The Home Page

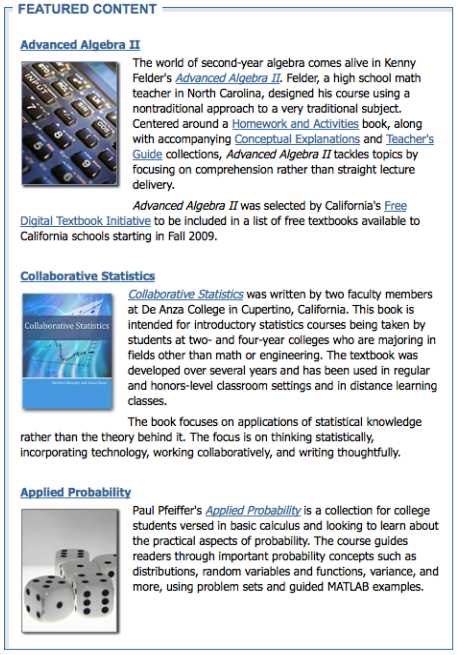


The Connexions home page (http://cnx.org/)

The following elements appear on the Connexions home page:

Featured Content

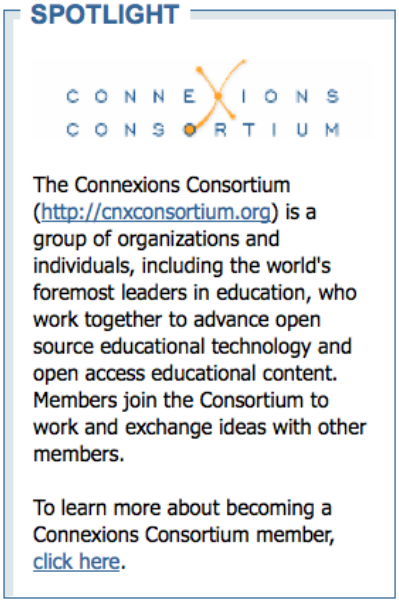
The Featured Content portlet highlights exemplary content that shows what you can do with Connexions. New authors may want to use these materials for inspiration.



The Featured Content portlet

Spotlight and News

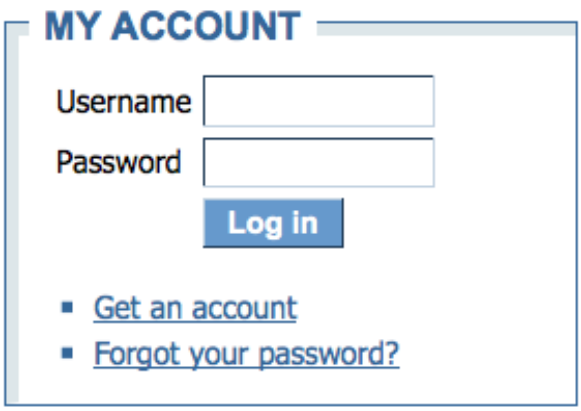
The Spotlight portlet provides a rotating set of vignettes highlighting user feedback, author profiles, and important Conneixons announcements. Hear what's going on with the project and what others have to say about it.



The Spotlight portlet showing an announcement

My Account

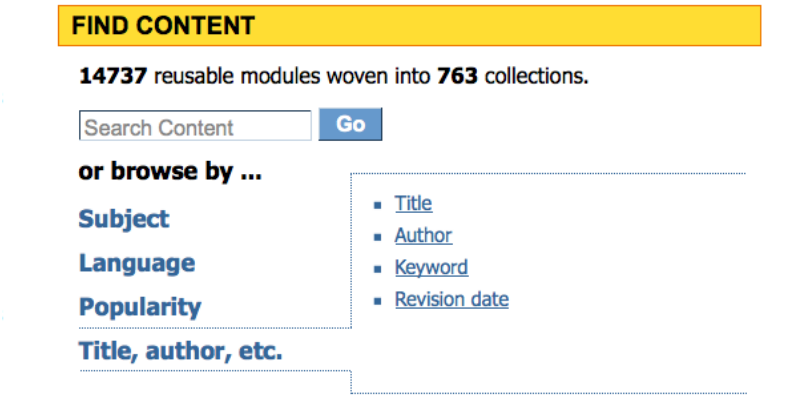
From the My Account portlet you can log in, request an account, or recover a lost password.



The My Account portlet

Find Content

The Find Content portlet provides a convenient, abbreviated version of the content search (a full search also available under the “Content” tab or the search bar in the upper right).



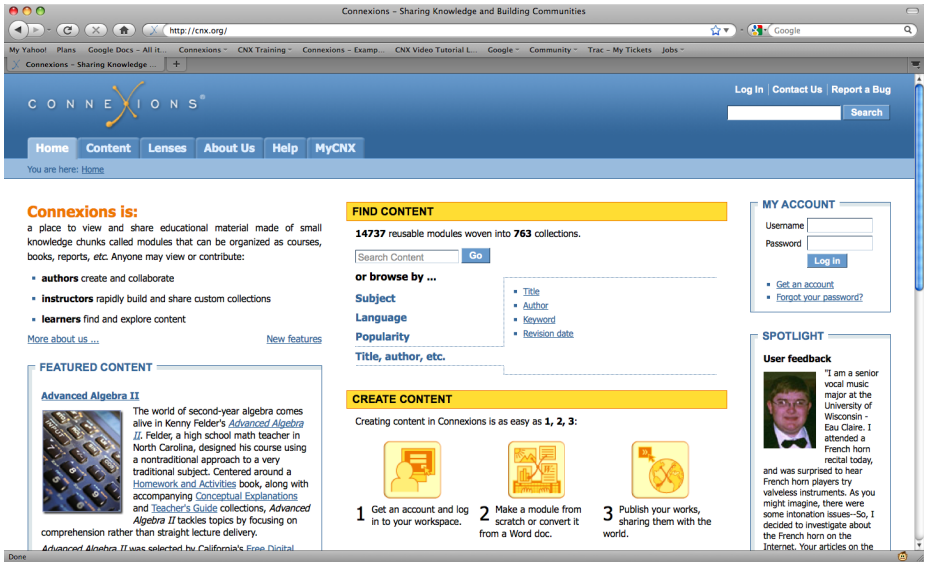
The Find Content portlet

Navigation

The following tabs are used for navigation and appear on every page within Connexions:

Home

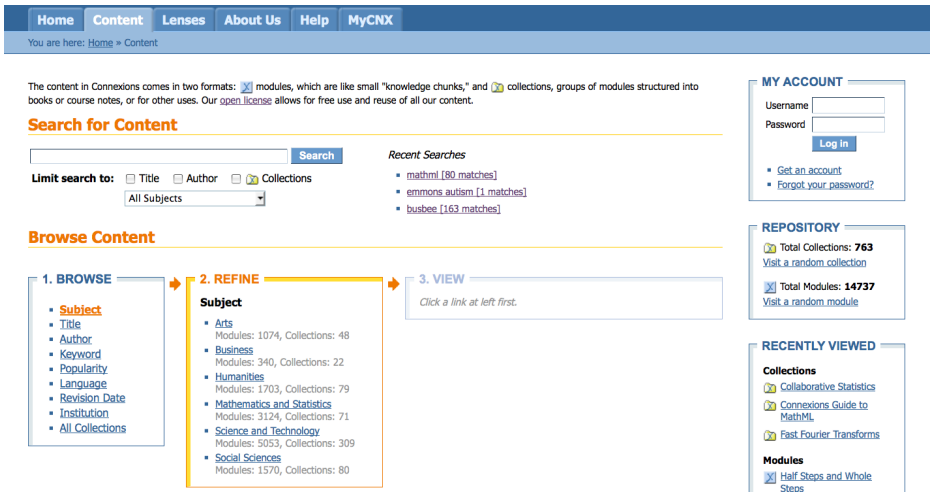
The Home tab will return you to the Connexions home page, located at http://cnx.org/.



The Home tab

Content

The Content tab directs you to a comprehensive Search and Browse engine for the Connexions content repository. From here you to search or browse by author, title, subject, language, etc.



The Content tab

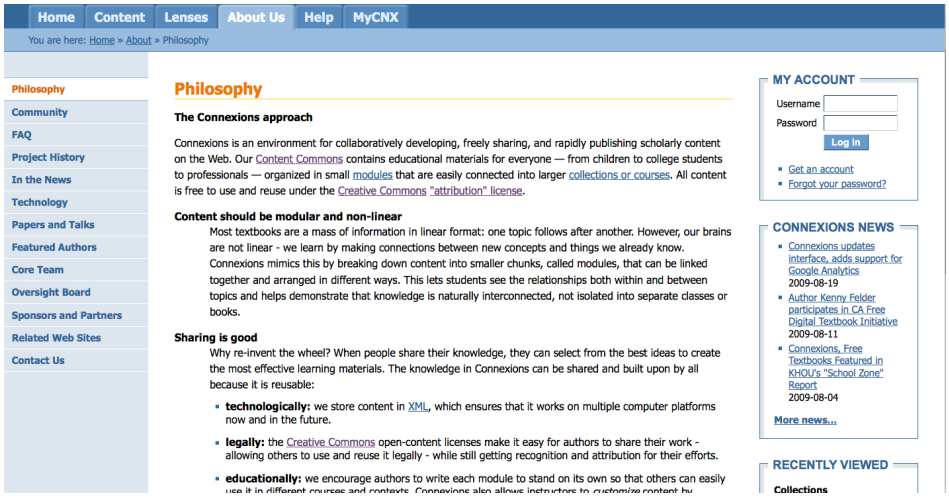
Lenses

The Lenses tab presents a page listing all public lenses, allowing you to find content that has been endorsed by, affiliated with, or recommended by other Connexions users (the Lenses feature will be described in more detail later in the workshop).

The Lenses tab

About Us

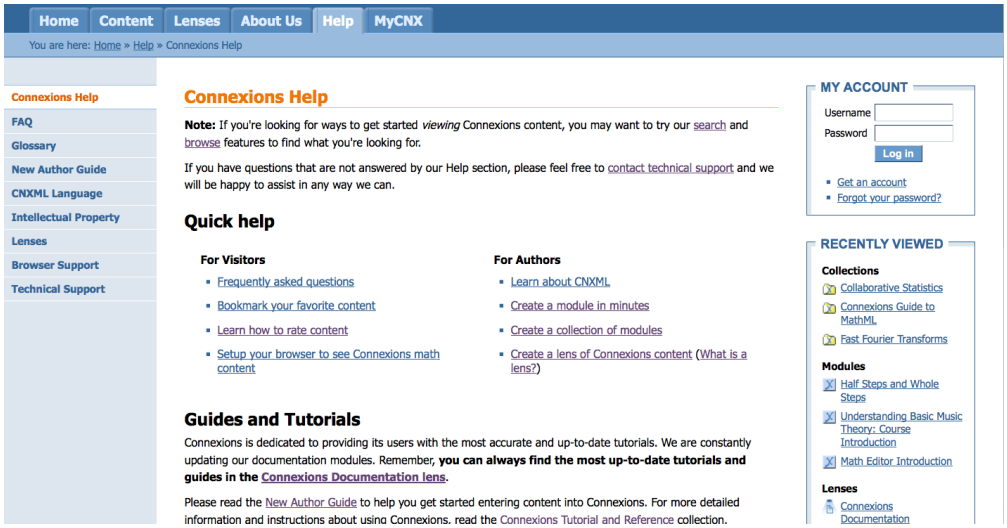
The About Us tab directs you to information about the Connexions project, including our philosophy and mission, project history, sponsors, and so on.



The About Us tab

Help

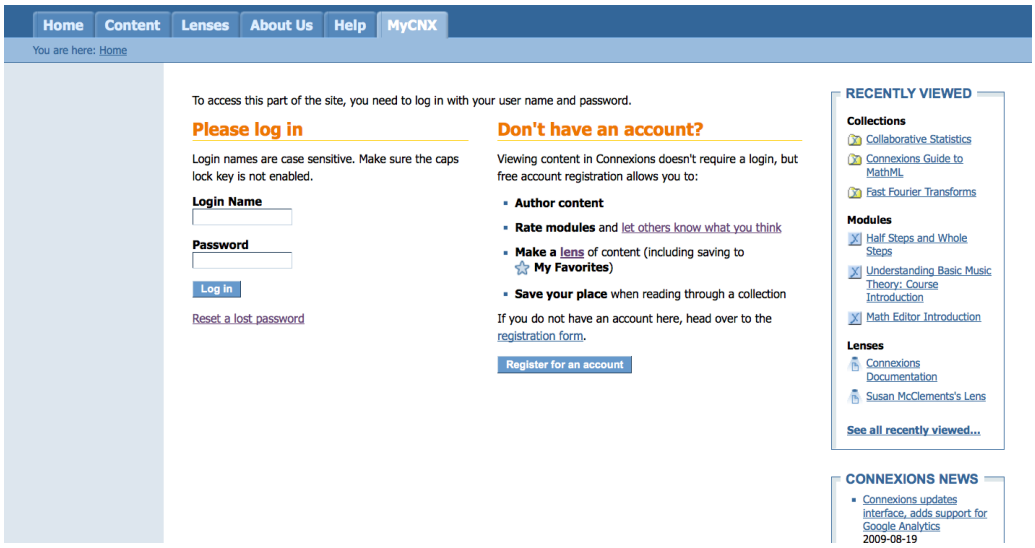
The Help tab links to a number of helpful resources, including site feature documentation, author guides, and technical support contact information.



The Help tab

MyCNX

The MyCNX tab links to the authoring interface. This is the only area of the site you need to log in to your account.



The MyCNX tab

Modules

This module explains the concept of a "module" within the Connexions system. Learners are introduced to the "Lego block" approach to building textbooks, courses, and other learning deliverables through the creation of small, interchangeable learning objects.

Note: See Also:

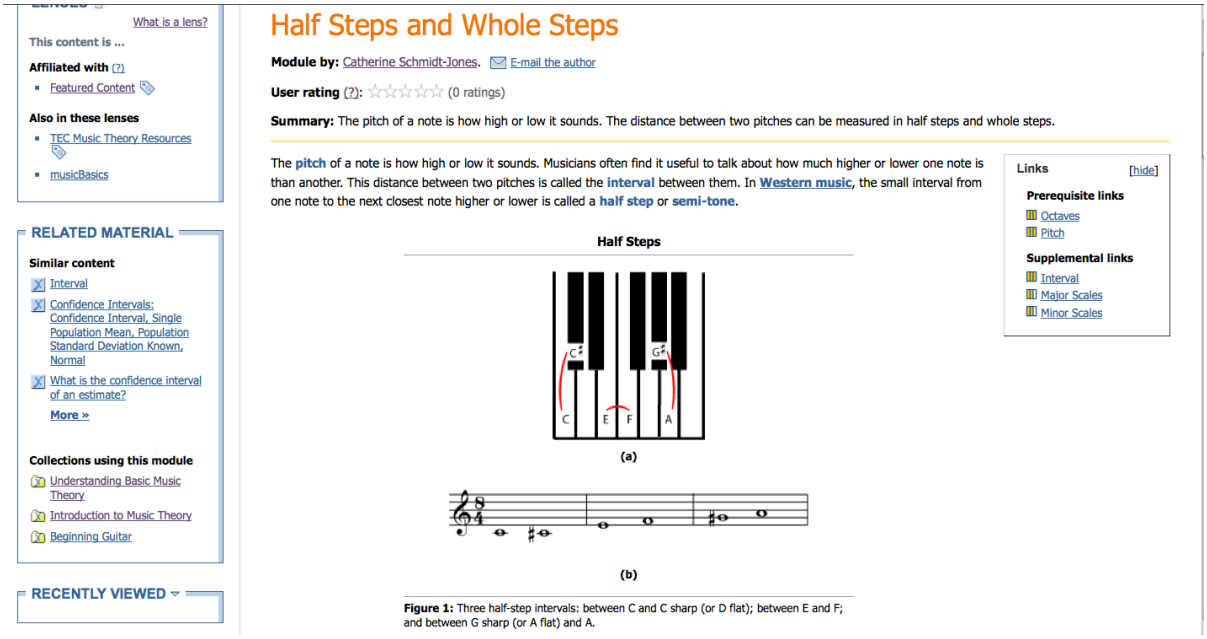
- Viewing Connexions Content (http://cnx.org/content/m11836/latest/)
- About Us/Philosophy (http://cnx.org/aboutus/)

You may have noticed that we refer to content as either a ‘module’ or a ‘collection’. You can think of modules like Lego blocks; they come in all different shapes, colors, and sizes, each with a different purpose in mind, and each capable of standing alone or being combined with other pieces.

A module should be designed as a standalone piece of content, usually a single idea or an aspect of a complex idea. Ideally you want to make your module as small as possible without making it dependent on other modules so that other authors can more easily repurpose your work.

Examples of a module can include a chapter of a book, a section from a chapter, a journal article, a lab exercise, a homework assignment, or a daily lesson plan, to name a few.

Take a look at an example module, Half Steps and Whole Steps (http://cnx.org/content/m10866/latest/):



A module in Connexions illustrating the use of links, terms, figures, and subfigures

In this case, the module is a single lesson on the topic of Half Steps and Whole Steps; users coming to this from Google or through a Connexions search will be able to use this module as a standalone unit of learning without relying on any additional modules.

Notice the use of the following Connexions features:

- Links to other resources (internal and external links)
- Terms (can be used as index terms or as glossary terms if definitions provided)
- Figures and Subfigures (note that these - and other - items are automatically numbered and labeled by Connexions)

A **whole tone scale**, a scale made only of whole steps, sounds very different from a chromatic scale.

Whole Tone Scale

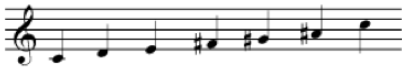


Figure 4: All intervals in a **whole tone scale** are whole steps.

Listen to a whole tone scale.

You can count any number of whole steps or half steps between notes; just remember to count all sharp or flat notes (the black keys on a keyboard) as well as all the natural notes (the white keys) that are in between.

EXAMPLE 1

The interval between C and the F above it is 5 half steps, or two and a half steps.

Figure 5: Going from C up to F takes five half steps.

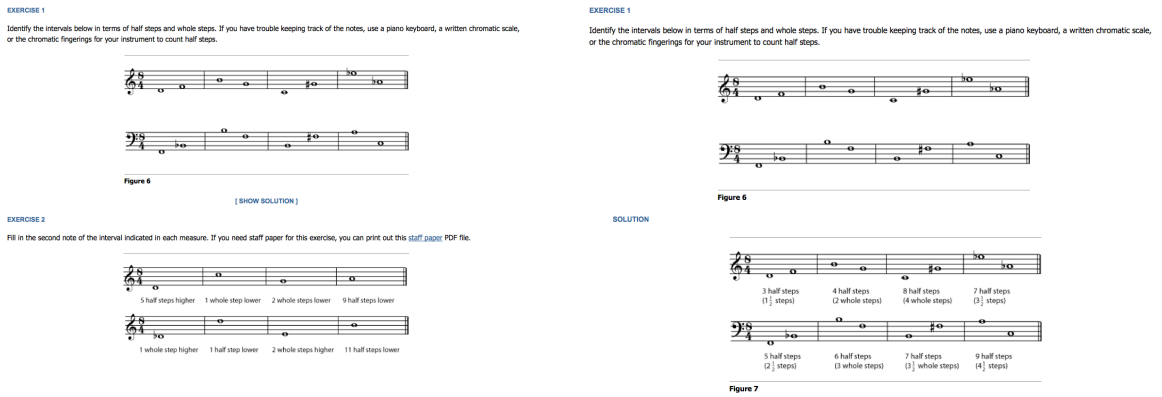
A module in Connexions illustrating the use of media elements and examples

- Multimedia files

> **Note:**Notice the “Listen” link following the Whole Tone Scale figure - this links to a .midi file that is played directly in the browser. In general, if you can embed it or play it in a web browser, you can include it in a Connexions module (assuming your audience’s browsers have the appropriate plug-ins).

- Examples

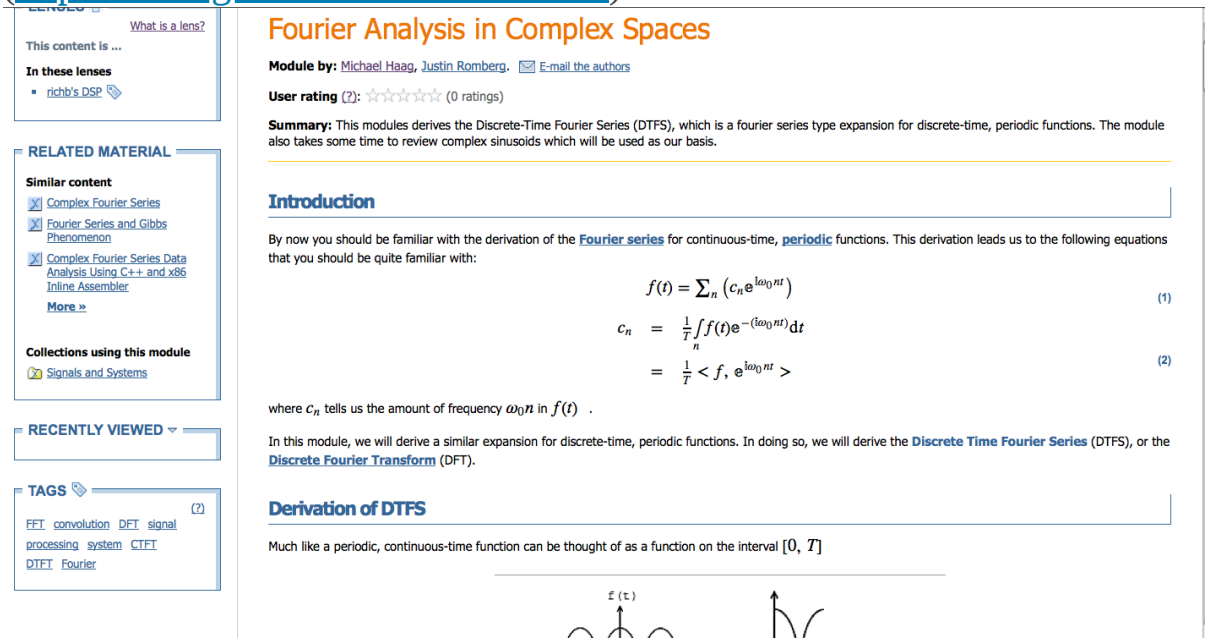
An exercise with a hidden solution	The same exercise with the solution revealed



A module in Connexions illustrating the use of an exercise

- Exercises (notice the “Show/Hide Solution” feature)

Here’s another example, this time one involving math, covering the topic of Fourier Analysis in Complex Spaces (http://cnx.org/content/m10784/latest/):

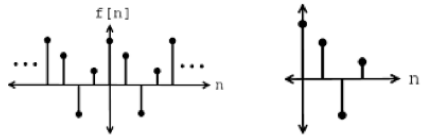


A module in Connexions illustrating the use of sections, equations, and MathML

a periodic, discrete-time signal, where $N = 4$:

$$\{\ldots, 3, 2, -2, 1, 3, \ldots\}$$

We can represent this signal as either a periodic signal or as just a single interval as follows:



(a) Periodic Function **(b)** Function on the interval $[0, T]$

Figure 2: Here we can look at just one period of the signal that has a vector length of four and is contained in $\mathbb{C}^4$.

NOTE: The set of discrete time signals with period N equal $\mathbb{C}^N$.

Just like the continuous case, we are going to form a basis using **harmonic sinusoids**. Before we look into this, it will be worth our time to look at the discrete-time, complex sinusoids in a little more detail.

Complex Sinusoids

If you are familiar with the basic **sinusoid signal** and with **complex exponentials** then you should not have any problem understanding this section. In most texts, you will see the the discrete-time, complex sinusoid noted as:

$$e^{i\omega n}$$

EXAMPLE 1

A module in Connexions illustrating the use of notes and subsections (nested elements)

This module includes several elements as the previous example, but also includes:

- Sections and Subsections (note the use of nested elements)
- Equations (also numbered automatically by Connexions)
- Notes
- Theorems

THEOREM 1

If we let

$$\forall\, n,\ n = \{0,\ \ldots,\ N-1\} : \left(b_k[n] = \frac{1}{\sqrt{N}} e^{i\frac{2\pi}{N}kn} \right)$$

where the exponential term is a vector in $\mathbb{C}^N$, then $\{b_k\}\ \ |_{k=\{0,\ldots,N-1\}}$ is an **orthonormal basis** for $\mathbb{C}^N$.

PROOF

First of all, we must show $\{b_k\}$ is orthonormal, *i.e.* $< b_k,\ b_l > = \delta_{kl}$

$$< b_k,\ b_l > = \sum_{n=0}^{N-1} \left(b_k[n] \overline{b_l[n]} \right) = \frac{1}{N} \sum_{n=0}^{N-1} \left(e^{i\frac{2\pi}{N}kn} e^{-\left(i\frac{2\pi}{N}ln\right)} \right)$$

$$< b_k,\ b_l > = \frac{1}{N} \sum_{n=0}^{N-1} \left(e^{i\frac{2\pi}{N}(l-k)n} \right) \tag{8}$$

If $l = k$, then

$$\begin{aligned} < b_k,\ b_l > &= \frac{1}{N} \sum_{n=0}^{N-1} (1) \\ &= 1 \end{aligned} \tag{9}$$

If $l \neq k$, then we must use the "partial summation formula" shown below:

$$\sum_{n=0}^{N-1} (\alpha^n) = \sum_{n=0}^{\infty} (\alpha^n) - \sum_{n=N}^{\infty} (\alpha^n) = \frac{1}{1-\alpha} - \frac{\alpha^N}{1-\alpha} = \frac{1-\alpha^N}{1-\alpha}$$

$$< b_k,\ b_l > = \frac{1}{N} \sum_{n=0}^{N-1} \left(e^{i\frac{2\pi}{N}(l-k)n} \right)$$

where in the above equation we can say that $\alpha = e^{i\frac{2\pi}{N}(l-k)}$, and thus we can see how this is in the form needed to utilize our partial summation formula.

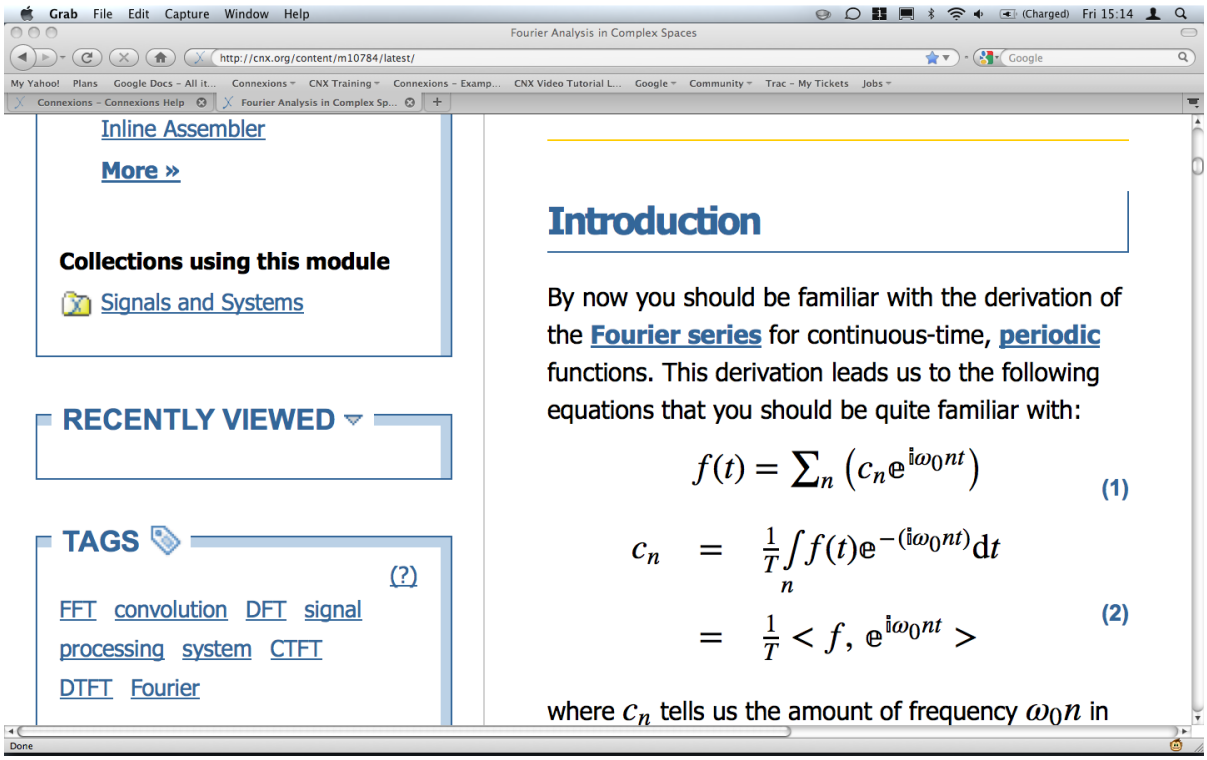
$$< b_k,\ b_l > = \frac{1}{N} \left(\frac{1 - e^{i\frac{2\pi}{N}(l-k)N}}{1 - e^{i\frac{2\pi}{N}(l-k)}} \right) = \frac{1}{N} \left(\frac{1-1}{1 - e^{i\frac{2\pi}{N}(l-k)}} \right) = 0$$

So,

$$< b_k,\ b_l > = \begin{cases} 1 \text{ if } k = l \\ 0 \text{ if } k \neq l \end{cases} \tag{10}$$

A module in Connexions illustrating the use of a theorem

You may have noticed the use of MathML, a W3C standard language for representing mathematics. This is important because MathML content can be transferred between applications while retaining meaning, is more easily maintained than image files, and is compatible with accessibility features such as screen readers for visually-impaired users.



This image shows the display of MathML content after zooming in to several times the standard font size.